



Mental Health Impact of the Iraq and Afghanistan Conflicts: A Review of U.S. Research, Service Provision, and Programmatic Responses

***Timothy S. Wells
Shannon C. Miller
Amy B. Adler
Charles C. Engel
Tyler C. Smith
John A. Fairbank***



Naval Health Research Center

Report No. 11-10

The views expressed in this article are those of the authors and do not necessarily reflect the official policy or position of the Department of the Navy, Department of Defense, nor the U.S. Government. Approved for public release: distribution is unlimited.

***Naval Health Research Center
140 Sylvester Road
San Diego, California 92106-5321***

Mental health impact of the Iraq and Afghanistan conflicts: A review of US research, service provision, and programmatic responses

TIMOTHY S. WELLS¹, SHANNON C. MILLER², AMY B. ADLER³, CHARLES C. ENGEL⁴, TYLER C. SMITH¹ & JOHN A. FAIRBANK⁵

¹Center for Deployment Health Research, Naval Health Research Center, San Diego, California, ²Vulnerability Analysis Branch, United States Air Force Research Laboratory, Wright-Patterson Air Force Base, Ohio, Veterans Affairs Medical Center, Cincinnati, Ohio, USA and Center for Treatment, Research, and Education in Addictive Disorders at University of Cincinnati Department of Psychiatry and Behavioral Neuroscience, Cincinnati, Ohio, USA, ³US Army Medical Research Unit-Europe, Walter Reed Army Institute of Research, Heidelberg, Germany, ⁴Department of Psychiatry, Uniformed Services University, Bethesda, MD, USA and Deployment Health Clinical Center, Walter Reed Army Institute of Research, Washington, DC, USA and ⁵Department of Psychiatry and Behavioral Sciences, Duke University Medical Center, Durham, North Carolina, USA and Mid-Atlantic (VISN 6) Mental Illness Research, Education and Clinical Center, Durham, North Carolina, USA

Abstract

Although documentation that war inflicts psychological casualties dates back to the American Civil War and earlier, most research began after the Vietnam conflict, when studies focused on post-traumatic stress disorder (PTSD). With ongoing conflicts in Iraq and Afghanistan, there has been significant research to illuminate the epidemiology of war-related psychological casualties. Significant findings include an appreciation for the role combat plays in the development of mental disorders, including PTSD and traumatic brain injury (TBI). Recent research has endeavoured to understand and improve psychological resilience to temper potentially adverse mental health effects of military service in the theatre of combat operations. Over 2 million US service members have now deployed and returned over 3 million times to the Iraq and Afghanistan conflicts. Mental health providers in the Departments of Defense and Veterans Affairs healthcare systems have consequently observed steep increases in mental health service use among these personnel. The Departments have responded aggressively to bolster staffing levels, increase capacity, improve available services, and anticipate future needs. Scientists and clinicians continue efforts to understand the determinants, prevention, recognition, and treatment of combat-related mental disorders.

Introduction

The first decade of the new millennium has yielded prolonged US combat operations in two major theatres, stretching the force and challenging public resolve. This period has also witnessed significant advances in military operational medicine brought forth by the necessity to identify and care for a growing number of service personnel manifesting mental health consequences. Focused efforts to reduce stigma, eliminate barriers to care, and increase viable options for assistance and treatment have led to increased resource use among those faced with war-related mental health issues. The medical and research community are still learning the extent that these efforts are mitigating the short and long-term mental health impacts of these conflicts. As we learn, we continue to examine and adjust the continuum of mental health research and assistance for US military service members, from screening, symptom assessment, and resilience training

before and after combat deployment to post-deployment clinical prevention, primary care recognition and early intervention, specialized treatment programmes, and disability compensation. This report presents our perspective.

Past psychological burden of war

On the evening of 11 November 2010, Veterans Day in the USA, the American cable television channel HBO aired a documentary titled 'Wartorn: 1861–2010'. This documentary chronicled the psychological impact of war from the American Civil War (1861–1865) through to the current wars in Iraq and Afghanistan. The overarching public health message in this powerful film was that post-war mental health and readjustment problems have been prevalent in the aftermath of wars throughout history and are evident today among surviving veterans. This documentary was consistent

Correspondence: Timothy S. Wells, Center for Deployment Health Research, Naval Health Research Center, 140 Sylvester Road, San Diego, CA 92106-5122, USA. Tel: 1-517-345-7488. Fax: 1-517-345-7488. E-mail: timothy.wells@med.navy.mil

(Received 3 December 2010; accepted 26 January 2011)

ISSN 0954-0261 print/ISSN 1369-1627 online © 2011 Institute of Psychiatry
DOI: 10.3109/09540261.2011.558833

with findings from epidemiological studies of the burden of war-related readjustment problems among veterans of earlier and current wars.

Scientific interest in post-war clinical syndromes, such as post-traumatic stress disorder (PTSD) resulted largely from the post-war readjustment problems of Vietnam War veterans (Cozza, 2005). The National Vietnam Veterans Readjustment Study (NVVRS) (Kulka *et al.*, 1990) estimated the lifetime prevalence of PTSD for men was 30.9% and 26.9% for women, and the current prevalence of PTSD was 15.2% for men and 8.1% for women (Schlenger *et al.*, 1992). Later analyses of the same data using updated DSM-IV case criteria requiring significant impairment in functioning along with characteristic symptoms produced adjusted PTSD prevalence estimates of 9.1% for current PTSD, and 18.7% for lifetime PTSD (Dohrenwend *et al.*, 2006). Similarly, a large population-based sample of Gulf War veterans found that the prevalence of current PTSD was 12.1% in this cohort, with an adjusted current PTSD prevalence estimate of 10.1% (Kang *et al.*, 2003). Ten years later, the adjusted prevalence was 15.2% versus only 4.6% among non-deployed Gulf War era veterans (Kang *et al.*, 2009). Prevalence rates for PTSD after peacekeeping operations have been generally lower, with only 1% of Bosnia peacekeepers reporting symptoms of PTSD to 8% for those who deployed to Somalia (Maguen *et al.*, 2006).

The present psychological burden of war

The scientific exploration of mental disorders among Vietnam and Gulf War veterans established the foundation for what would lead to a substantially larger investment of resources to investigate the mental health of US service members who deployed to the Iraq and Afghanistan conflicts. In contrast to previous published studies of Vietnam-era and Gulf War-era veterans that were conducted a number of years after the cessation of conflict, all studies conducted among Iraq and Afghanistan deployers have been conducted while operations remain ongoing. Benefits derived from this approach are the potential to reduce biased recall of combat and related exposures and to use study results to design clinical and programme responses, and to influence policy decisions intended to improve and protect the health of the force.

Posttraumatic stress disorder

In an anonymous, serial cross-sectional survey study, Hoge *et al.* found PTSD prevalences for US combat troops returning from Iraq and Afghanistan to be 18% and 12%, respectively, compared to 9% before deployment (Hoge *et al.*, 2004). In a clinical sample

of US service members, 19% presenting to a mental health clinic in Kuwait reported PTSD-related symptoms (Felker *et al.*, 2008). Since 2001, the Department of Veterans Affairs (VA) has also experienced an increase in Iraq and Afghanistan veterans seeking care and diagnosed with mental disorders. Seal *et al.* determined longitudinal trends and risk factors for mental health diagnoses among a select sample of first-time users of VA services after the start of the Iraq/Afghanistan conflicts and estimated 21.8% received a provider diagnosis of PTSD (Seal *et al.*, 2009).

In recent years, significant gains have been made in understanding the relations between deployment and PTSD. Using anonymous samples and pre- and post-deployment questionnaires, Hoge *et al.* were among the first to document a positive association between exposure to combat and PTSD in US Army and Marine Corps personnel who served in Iraq and Afghanistan (Hoge *et al.*, 2004). This finding was supported by Smith *et al.* who used prospective Millennium Cohort data and found that US service members who deployed and reported combat exposures were at greater adjusted odds for PTSD than US service members who deployed without combat exposure, or were non-deployed (Smith *et al.*, 2008a). Maguen and colleagues found that 40% of conflict veterans reported killing in combat on post-deployment mental health assessment, and that killing in combat was significantly associated with PTSD, alcohol abuse, anger, as well as relationship problems even after controlling for other combat exposures (Maguen *et al.*, 2010a).

Traumatic brain injury

Current conflicts in Iraq and Afghanistan are somewhat unique because hostile forces employ more improvised explosive devices against US forces than previously experienced. With improved armoured protection, and advances in battlefield medicine and surgery, a greater proportion of service members are surviving significant injuries. Many of these survivors now face a life of health challenges related to traumatic or surgical amputation, traumatic brain injury (TBI), optical injury, and polytraumatic issues, all of which place them at risk for subsequent mental health conditions. Results from the US Army TBI Task Force reported estimates of 10% to 20% of soldiers with a combat-related injury also had a TBI (US Army, 2008), while internal Defense and Veterans Brain Injury Center data report that about 33% of those service members who required specialist care at Walter Reed Army Medical Center for combat-related injuries also had a TBI (French, 2009). For purposes of comparison, approximately 12–14% of Vietnam veterans (Okie, 2005; Schwab *et al.*, 2003) and 20% of 1991 Gulf War veterans (Carey, 1996; Leedham *et al.*, 1993) who survived their wounds had head

injuries. Two studies of Iraq veterans reported seemingly similar rates of TBI among population-based samples of returning Iraq veterans but nearly all affected veterans in these samples reflected mild TBI. Terrio and colleagues performed clinical assessments on roughly 4,000 recently returned Army soldiers and 22.8% were diagnosed with TBI (Terrio *et al.*, 2009). In an anonymous survey, Hoge and collaborators found that 15% of 2,525 returnees reported TBI during deployment (Hoge *et al.*, 2008).

Several studies have identified associations between TBI and mental health problems among returning US service members. In the previously mentioned study by Hoge *et al.* (2008) a dose–response relationship between severity of mild TBI and current PTSD was identified: 44% of soldiers reporting TBI with loss of consciousness met criteria for PTSD compared with 27% among those reporting TBI with altered mental status but no loss of consciousness, 16% among those reporting non-TBI injuries, and 9% among those with no injury. The figures meeting criteria for depression were 23%, 8%, 7%, and 3% respectively. In a study conducted in VA healthcare facilities, over 80% of the veterans who screened positive for TBI had comorbid psychiatric diagnoses (Carlson *et al.*, 2010). Of note, the screening tool used to help identify TBI in all of these studies remains un-validated.

Members of the Reserve and National Guard

Members of the Reserve and National Guard (Reserve/Guard), arguably face a range of unique ‘citizen-soldier’ stressors when they deploy. They must vacate and then return to another full-time occupation, often do not interact regularly with members of their unit prior to deployment, are often geographically remote from assigned duty locations, frequently do not deploy to the combat theatre in the same unit with which they train, and then lose unit integrity again on demobilization and return to post-deployment civilian life.

Empirical studies of Reserve/Guard troops confirm their relative vulnerability to the impact of deployment-related stressors. A study of psychiatric evacuees found that members of the Reserve/Guard were more likely to be evacuated for mental disorders (Rundell, 2006). Reserve/Guard members were found to have higher rates of mental health care use in the first 12 months after deployment (Kim *et al.*, 2010), and were more likely to report an increase in prevalence of mental disorders between 3 and 12 months post-deployment, compared with active-duty members with similar exposures (Thomas *et al.*, 2010). Additionally, Reserve/Guard personnel who deployed with combat exposures were also observed to be at increased odds for new-onset of heavy weekly drinking, binge drinking, and other alcohol-related problems,

whereas active-duty personnel who deployed with combat exposures were only at increased odds for new-onset binge drinking (Jacobson *et al.*, 2008). Finally, using longitudinal data from the DoD Post-Deployment Health Assessment and Post-Deployment Health Reassessment Programs, Milliken *et al.* (2007) found significantly greater increases in rates of screening positive for PTSD, depression, and other indicators of psychosocial adjustment issues among Reserve/National Guard versus active component troops.

Women deployers

Differences in mental disorder risk among deployed men and women remain somewhat controversial. A retrospective study of US Army soldiers deployed to Iraq and Afghanistan found that women were 1.6 to 3 times more likely to be diagnosed with a mental disorder (Wojcik *et al.*, 2009). Other studies have observed that female service members are at higher risk for new-onset disordered eating (Jacobson *et al.*, 2009), and sexual trauma (Haskell *et al.*, 2010; Kimerling *et al.*, 2010). However, sex differences affecting the association between combat deployment with PTSD and depression are less clear. While studies have found deployed women to be at increased risk for depression (Haskell *et al.*, 2010; Maguen *et al.*, 2010b; Wells *et al.*, 2010), a survey conducted among deployed US Army soldiers found similar rates for symptoms of PTSD and depression among men and women (MHAT-II, 2005), while another study found consistent two-fold increases for newly reported PTSD symptoms post-combat in men and women reporting previous physical and sexual traumas (Smith *et al.*, 2008b). With lines of battle poorly defined in current conflicts, men and women are exposed to similar combat-related stressors. Some hypothesize that findings of similar rates of PTSD and depression among deployed men and women are due to relatively equivalent combat-like exposures that confer similar risks among men and women for PTSD and depression (Hoge *et al.*, 2007a). Clearly, further research is needed to assess how sex differences may contribute to short- and long-term mental disorder risks associated with combat.

Psychological resilience

Psychological resilience, the ability to maintain relatively normal levels of mental and physical functioning following exposure to a traumatic event (Bonanno, 2004), is a challenge to define clearly, but has become increasingly studied and the focus of programmes that aim to foster improved deployment mental health outcomes. This has been made possible as much of the Iraq/Afghanistan deployment-related research is now conducted real-time, allowing findings to drive

prevention efforts. For example, one study showed that lower unit support and post-deployment social support were associated with increased PTSD and depressive symptoms, and decreased resilience and psychosocial functioning (Pietrzak *et al.*, 2009), while another study showed that the number of close friends or relatives decreased the risk for post-deployment PTSD in a group of US Marines (Phillips *et al.*, 2010). These observations are consistent with a study of Air Force medical personnel in which the authors concluded that unit cohesion protected against PTSD regardless of level of stress exposure (Dickstein *et al.*, 2010). Additionally, resilience to PTSD and/or depression following deployment appears to be adversely affected among those who reported childhood trauma (Cabrera *et al.*, 2007; LeardMann *et al.*, 2010), prior assault (Smith *et al.*, 2008b), or screened in the lowest 15% of functional health prior to deployment (LeardMann *et al.*, 2009).

While all the US services have had active mental healthcare initiatives and psycho-educational programming designed to improve service member adaptation (Bowles & Bates, 2010; Warner *et al.*, 2011), one of the hallmark changes during the current conflicts has been the US Army's introduction of a system of resilience training, which has evolved over time. In 2007, the US Army launched the Battlemind training system. Battlemind, developed by the Walter Reed Army Institute of Research, was grounded in research documenting the mental health costs of deployment to Iraq and Afghanistan, as well as the stigma associated with seeking treatment for mental health problems (Hoge *et al.*, 2004), the importance of the military unit in promoting resilience (Bliese, 2006), and the impact of leader behaviours on soldier well-being (Britt *et al.*, 2004). To date, three group-randomized trials conducted at post-deployment suggest the efficacy of Battlemind training (Adler *et al.*, 2007, 2009; Thomas *et al.*, 2007). Other studies documented the link between pre-deployment training and better mental health during deployment (MHAT-V, 2008). These encouraging findings demonstrate the potential feasibility of improving soldier mental health through resilience training, although effect sizes were small, consistent with public health-style interventions (Bliese *et al.*, 2011).

These research findings are also leading to programmatic change. In 2009, the US Army's senior leadership identified resilience as a top priority and launched Comprehensive Soldier Fitness (CSF), a new and broader programme that integrated a revised version of Battlemind training (now called resilience training) with material from the Penn Resiliency Program (PRP) (Gillham *et al.*, 2007) and the Army Center for Enhanced Performance (Casey, 2011; Cornum *et al.*, 2011). Despite the importance of service members receiving validated early interventions, research findings have not fully caught up with the need to

provide early intervention programmes in the current deployment context. Nevertheless, elements of the CSF programme have been validated, and the goal is to ensure that new resilience training material provided under this programme will only be incorporated after efficacy with soldiers has been established (Lester *et al.*, 2011).

Department of Defense and National Institute of Mental Health response

Of the 340,000 US active component and reserve component (the latter includes both National Guard and Reserves) service members completing the post-deployment questionnaires, approximately 5–10% were referred for mental health evaluation, and among those referred, approximately 95% recorded an inpatient or outpatient visit within 6 months of the referral date (MSMR, 2010). Roughly translated, this equates to somewhere between 16,000–32,000 deployed US service members who had one or more health care visits for a mental health evaluation during this 12-month period. The burden on the US military mental health community was also increased by the National Defense Authorization Act for fiscal year (FY) 2010, which required the DoD to implement person-to-person mental health assessments for each US service member who has been deployed in connection with a contingency operation (Assistant Secretary of Defense for Health Affairs, 2010).

The National Institute of Mental Health (NIMH) is heavily invested in studying the psychological consequences of war. During FY 2009, NIMH spent over US\$41 million dollars on 97 grants to improve the mental health of veterans (Insel, 2010). A promising area of NIMH-funded research has included early psychosocial intervention for PTSD symptoms using cognitive behavioural therapeutic self-management models delivered over a web-based interface and assistance from a health care provider or coach. Litz and colleagues tested this approach in a small randomized trial and found surprisingly robust effects versus a web-based supportive counselling control approach (Litz *et al.*, 2007). This group is currently nearing the completion of a second controlled trial in primary care patients with PTSD (Engel *et al.*, 2009). The patient is assisted by a primary care nurse, and it may be useful for military personnel who are ambivalent about seeking care from a specialist. Other NIMH research has focused on PTSD as a disorder of brain circuits needed to extinguish fear (Milad & Quirk, 2002), and on PTSD-related fear extinction as an active learning process (Bouton, 2004) that may be specifically aided by the partial N-methyl d-aspartate agonist called d-cycloserine (Guastella *et al.*, 2008; Hofmann *et al.*, 2006; Ressler *et al.*, 2004). NIMH-funded researchers are also attempting to identify genetic

biomarkers that may be associated with PTSD, and are exploring potential preventive pharmacologic approaches for PTSD (Insel, 2010).

Assessing long-term symptoms

Although not unique to the conflicts in Iraq and Afghanistan, many concerns remain about the long-term effects of PTSD and other war-related mental health conditions, especially when over 2 million US service members have deployed in support of these operations. For example, how do we best identify and monitor the continuum of risk behaviours that are associated with PTSD and co-occurring disorders? This is an important question given recent research findings that psychiatric disorders are a major risk factor for increased mortality among veterans (Chwastiak *et al.*, 2010). In addition, the family members of service men and women deployed to Iraq or Afghanistan appear to be at significantly increased risk for mental disorders and increased mental health service use (Mansfield *et al.*, 2010a; Mansfield *et al.*, 2010b). Similarly, recent research has shown that increases in PTSD symptoms among National Guard soldiers following deployment to Iraq were associated with poorer couple adjustment and greater perceived parenting challenges (Giwertz *et al.*, 2010). Thus, war-related psychiatric consequences may even cross generations.

Primary care is a promising early intervention opportunity for service members and veterans with PTSD. Civilian, VA, and military population-based studies suggest that at least half of individuals with PTSD remain untreated, sometimes for many years, and the reasons are complex (Hoge *et al.*, 2004; Kessler, 2000; Magruder *et al.*, 2005; Wang *et al.*, 2005). However, the average military service member makes about 3.4 visits to primary care annually (Engel, 2005) – even more often if they meet criteria for PTSD (Hoge *et al.*, 2007b). A growing scientific literature suggests that systems-based primary care approaches lead to improved mental health services and outcomes for common mental disorders including PTSD (Engel *et al.*, 2008). One military example is called RESPECT-Mil (Re-Engineering Systems of Primary Care Treatment for PTSD and Depression in the Military) and includes routine primary care screening for PTSD and depression, the use of a validated and efficient diagnostic aid for service members that screen positive, a nurse care management option for those diagnosed with depression or ‘possible PTSD’, and weekly psychiatrist review of care managers’ caseload that leads to electronic feedback recommendations to the primary care provider. A feature of RESPECT-Mil is its use of a web-based informatics approach (Unützer *et al.*, 2002) that helps ensure careful follow-up in care management, timely treatment changes for patients

failing to respond, and benchmarking reports to guide care managers and clinic leaders. Since the late 1990s, the US Air Force has run a different primary care-mental health model called the Behavioral Health Optimization Program that uses an embedded mental health provider to improve mental health service access (Munsey, C., 2009). A number of psychometrically sound screening tools, diagnostic instruments, and trauma and symptom severity scales are available to facilitate and augment the clinical assessment of PTSD and other disorders such as substance misuse, mood and anxiety disorders (Ouimette *et al.*, 2010; Weathers *et al.*, 2009).

Current and future burden on the Department of Veterans Affairs

In the USA, the VA is the leading agency for veteran’s health benefits, including healthcare, compensation and benefits for war veterans for service-related illnesses and injuries. The VA healthcare system includes over 170 medical centres, 350 outpatient clinics, and 125 nursing facilities. In her statement to the US House of Representatives Committee on Veterans’ Affairs Hearing (‘The True Cost of War’), Bilmes stated that as of October 2010, 2.1 million Americans have served more than 3 million tours, with more than 90,000 injured and 600,000 treated by the VA (Bilmes, 2010). Nobel prize economist Joseph Stiglitz and Bilmes co-authored an estimate of the direct and indirect societal costs of the conflicts in Iraq and Afghanistan (Stiglitz & Bilmes, 2008), at between US\$2 trillion and \$5 trillion, depending on how certain variables used to forecast cost play out over future decades. In Bilmes’ statement to Congress, the health-related costs of the war (veterans’ medical, disability and Social Security), mainly the purview of the Department of Veterans Affairs, were estimated at between \$589 billion and \$984 billion. Costs already substantially higher than the earlier estimate of \$422 billion to \$717 billion (Stiglitz and Bilmes, 2008) and due to higher than anticipated rates of VA health service use and veteran filed disability claims. Based on the experience after previous conflicts, these costs typically rise and peak at 30–40 years after the conflict, as veterans get older and have increased health care needs (Bilmes, 2010; IoM, 2010).

Rising rates of VA use since the Vietnam War are consistent with rising health-related costs of war. Since 2002, 41% of the 837,458 separated Iraq/Afghanistan veterans eligible for VA healthcare have enrolled in the VA (Kang, 2008), compared with only 10% of Vietnam veterans who had enrolled for VA healthcare 15 years after the end of that conflict (Kulka *et al.*, 1990). According to the VA Office of Public Health and Environmental Hazards, during 2002–2009, over 1 million Iraq/Afghanistan veterans left active duty, of whom 46% sought services from the VA, and 48%

of those who sought care were diagnosed with a mental disorder (Department of Veterans Affairs, 2010).

It is expected that the number of veterans presenting to the VA with mental health issues will continue to escalate over the coming years. This is due in part to continued Iraq and Afghanistan operations, multiple deployments (Kline *et al.*, 2010), and delays from onset of mental disorder to presentation for health-care, and evidence of rising prevalence of mental disorders over time (Milliken *et al.*, 2007; Grieger *et al.*, 2006; Hoge *et al.*, 2006). For example, studies of US service members returning from Iraq/Afghanistan have found PTSD prevalence estimates of about 5% prior to deployment and 12% upon immediate return (Hoge *et al.*, 2004) and estimates of about 16% when surveyed one year after deployment (Hoge & Castro, 2006). Milliken *et al.* conducted a longitudinal study of soldiers, collecting PTSD prevalence information within one month and 4–10 months after deployment, and observed prevalence increases from 11.8% to 16.7% for active duty and 12.7% to 24.5% for Reserve/Guard (Milliken *et al.*, 2007). Bliese *et al.* conducted a matched study of 509 soldiers returning from combat in Iraq and results showed an increase in mental health problems at 120 days post-deployment in comparison to immediate reintegration (Bliese *et al.*, 2007). Finally, when Congress passed the National Defense Authorization Act of 2008 it increased the period of automatic healthcare coverage of all combat veterans from 3 to 5 years post-deployment, a move designed to ensure health benefits for demobilized reserve component service members. Demobilized Reserve/National Guard are not entitled to DoD healthcare system coverage beyond six months after demobilization or when subsequently mobilized to active military duty. These observations suggest that the VA may see a substantial increase in veterans' future medical and disability benefits healthcare seeking among Iraq and Afghanistan veterans.

In response, between FY 2009 and FY 2010 the VA increased core mental health staffing by 8%. Since 2004, the VA has conducted universal post-deployment mental health screening of Iraq/Afghanistan veterans receiving VA care. Beginning in 2005, the VA initiated an aggressive expansion of mental services capacity, including embedding mental health providers in primary care settings along the lines used in RESPECT-Mil and the Behavioral Health Optimization Project so as to reduce the effects of stigma and improve veteran access to mental health services (Hoge *et al.*, 2004; Zeiss & Karlin, 2008). Moreover, the VA is in the process of nationally disseminating and implementing evidence-based psychotherapies (EBPs) for PTSD, depression, and serious mental illness. Two EBPs for PTSD that the VA is currently disseminating—cognitive processing therapy (CPT) and prolonged exposure (PE) therapy—are augmented with the

placement of a part-time EBP Coordinator at each VAMC to serve as a champion for EBPs at the local level (McHugh & Barlow, 2010). As such, a February 2009 survey of VAMCs that assessed the extent to which CPT and PE were being provided to Iraq/Afghanistan veterans with PTSD revealed 94% of medical centres were providing CPT or PE, and 72% providing both.

Conclusions

There is a substantial body of literature to support a robust relation between exposure to combat and mental health outcomes, especially PTSD as well as head injuries, which includes TBI. It is unlikely that prevalence rates for mental disorders, such as PTSD have changed much from conflict to conflict. Prevalence rate estimates for PTSD among US service members serving in the era of the Iraq and Afghanistan conflicts have ranged from 12% of anonymously surveyed US Army combat troops, to over 20% among those seeking healthcare in VA settings. For the first time, military and VA researchers are estimating the mental health effects of military service and the needs of service members, families, and veterans nearly in real-time, allowing findings to have a rapid impact on mental health programmes and services aiming to improve resilience of US forces and mitigate the adverse mental health effects of war on those previously deployed. Despite gains to date, there is still enormous progress yet to make in areas such as effective treatment, improved understanding and reduction of chronicity, and mental health comorbidity. As mental health needs continue to mount for both DoD and VA, leaders from policy, research, and clinical realms will surely face increasingly difficult challenges and decisions, not the least of which will revolve around rising healthcare costs and the fiscal reality of finite resources in a time of national deficit spending.

Acknowledgments

We thank Daniel Kivlahan, Associate National Mental Health Director for Addictive Disorders, Office of Mental Health Services, Veterans Health Administration, for his insight into VA healthcare use; and Aaron I. Schneiderman, Acting Director, Environmental Epidemiology Service, Veterans Health Administration, for his insight into VA healthcare use.

Declaration of interest: This work represents report 11-XX, supported by the Department of Veterans Affairs, and the Department of Defense, under work unit no. 60002. The views expressed in this

article are those of the authors and do not reflect the official policy or position of the Department of the Navy, Department of the Army, Department of the Air Force, Department of Defense, Department of Veterans Affairs, or the US Government. This research has been conducted in compliance with all applicable federal regulations governing the protection of human subjects in research (Protocol NHRC.2000.0007). Approved for public release; distribution is unlimited. The authors alone are responsible for the content and writing of the paper.

References

- Adler, A.B., Bliese, P.D., McGurk, D., Hoge, C.W. & Castro, C.A. (2009). Battlemind debriefing and Battlemind training as early interventions with soldiers returning from Iraq: Randomization by platoon. *Journal of Consulting & Clinical Psychology*, 77, 928–940.
- Adler, A.B., Castro, C.A., Bliese, P.D., McGurk, D. & Milliken, C. (2007). The efficacy of Battlemind training at 3–6 months post-deployment. Paper presented at the Battlemind training system: Supporting soldiers throughout the deployment cycle symposium of the American Psychological Association Convention, San Francisco, CA, August.
- Assistant Secretary of Defense for Health Affairs (2010). Mental health assessments for members of the Armed Forces deployed in connection with a contingency operation (memorandum, July 19). Available at: http://www.health.mil/libraries/HA_Policies_and_Guidelines/10-005.pdf (accessed 2 December 2010).
- Bilmes, L.J. (2010). The true cost of war (statement to the House Committee on Veterans' Affairs, September 30). Available at: <http://democrats.veterans.house.gov/hearings/hearing.aspx?NewsID=632> (accessed 2 December 2010).
- Bliese, P.D. (2006). Social climates: Drivers of soldier well-being and resilience. In A.B. Adler, C.A. Castro & T.W. Britt (Eds.), *Military Life: The Psychology of Serving in Peace and Combat: Vol 2: Operational Stress* (pp. 213–234). Westport, CT: Praeger Security International.
- Bliese, P.D., Adler, A.B. & Castro, C.A. (2011). The deployment context: Psychology and implementing mental health interventions. In A.B. Adler, P.B. Bliese & C.A. Castro (Eds.), *Deployment psychology: Evidence-based strategies to promote mental health in the military* (pp. 103–124). Washington, DC: American Psychological Association.
- Bliese, P.D., Wright, K.M., Adler, A.B., Thomas, J.L. & Hoge, C.W. (2007). Timing of postcombat mental health assessments. *Psychological Services*, 4, 141–148.
- Bonanno, G.A. (2004). Loss, trauma, and human resilience: Have we underestimated the human capacity to thrive after extremely aversive events? *American Psychologist*, 59, 20–28.
- Bouton, M.E. (2004). Context and behavioral processes in extinction. *Learning & Memory*, 11, 485–494.
- Bowles, S.V. & Bates, M.J. (2010). Military organizations and programs contributing to resilience building. *Military Medicine*, 175, 382–385.
- Britt, T.W., Davison, J., Bliese, P.D. & Castro, C.A. (2004). How leaders can influence the impact that stressors have on soldiers. *Military Medicine*, 169, 541–545.
- Cabrera, O.A., Hoge, C.W., Bliese, P.D., Castro, C.A. & Messer, S.C. (2007). Childhood adversity and combat as predictors of depression and post-traumatic stress in deployed troops. *American Journal of Preventive Medicine*, 33, 77–82.
- Carey, M.E. (1996). Analysis of wounds incurred by US Army Seventh Corps personnel in Corps hospitals during Operation Desert Storm, February 20 to March 10, 1991. *Journal of Trauma*, 40(S3), S165–169.
- Carlson, K.F., Nelson, D., Orazem, R.J., Nugent, S., Cifu, D.X. & Sayer, N.A. (2010). Psychiatric diagnoses among Iraq and Afghanistan war veterans screened for deployment-related traumatic brain injury. *Journal of Traumatic Stress*, 23, 17–24.
- Casey, G.W. (2011). Comprehensive soldier fitness: A vision for psychological resilience in the US Army. *American Psychologist*, 66, 1–3.
- Chwastiak, L.A., Rosenheck, R.A., Desai, R. & Kazis, L.E. (2010). Association of psychiatric illness and all-cause mortality in the National Department of Veterans Affairs Health Care System. *Psychosomatic Medicine*, 72, 817–822.
- Cornum, R., Matthews, M.D., Seligman, M.E.P. (2011). Comprehensive soldier fitness: Building resilience in a challenging institutional context. *American Psychologist*, 66, 4–9.
- Cozza, S.J. (2005). Combat exposure and PTSD. *PTSD Research Quarterly*, 16, 1–8.
- Department of Veterans Affairs (2010). Mental health effects of serving in Afghanistan and Iraq. National Center for PTSD. Available at: <http://www.ptsd.va.gov/public/pages/overview-mental-health-effects.asp> (accessed 22 November 2010).
- Dickstein, B.D., McLean, C.P., Mintz, J., Conoscenti, L.M., Steenkamp, M.M., Benson, T.A., ... Litz, B.T. (2010). Unit cohesion and PTSD symptom severity in Air Force medical personnel. *Military Medicine*, 175, 482–486.
- Dohrenwend, B.P., Turner, J.B., Turse, N.A., Adams, B.G., Koenen, K.C. & Marshall, R. (2006). The psychological risks of Vietnam for US veterans: A revisit with new data and methods. *Science*, 313, 979–982.
- Engel, C.C. (2005). Improving primary care for military personnel and veterans with posttraumatic stress disorder – the road ahead. *General Hospital Psychiatry*, 27, 158–160.
- Engel, C.C., Oxman, T., Yamamoto, C., Gould, D., Barry, S., Stewart, P., Kroenke, K., Williams, J.W. Jr, Dietrich, A.J. (2008). RESPECT-Mil: Feasibility of a systems-level collaborative care approach to depression and post-traumatic stress disorder in military primary care. *Military Medicine*, 173(10), 935–940.
- Engel, C.C., Litz, B., Magruder, K., Gore, K., Harper, C.E. & Yeager, D. (2009) Randomized trial of a web-based nurse-assisted PTSD self-management intervention for primary care: Study design and status. Abstract. Paper presented at Symposium 6: Telemedicine. Mental Health Research Forum, Kansas City, MO, September.
- Felker, B., Hawkins, E., Dobie, D., Gutierrez, J. & McFall, M. (2008). Characteristics of deployed Operation Iraqi Freedom military personnel who seek mental health care. *Military Medicine*, 173, 155–158.
- French, L.M. (2009) Preface. *Journal of Head Trauma Rehabilitation*, 24, 1–3.
- Gillham, J.E., Reivich, K.J., Freres, D.R., Chaplin, T.M., Shatte, A.J., Samuels, B., ... Seligman, M.E. (2007). School-based prevention of depressive symptoms: A randomized controlled study of the effectiveness and specificity of the Penn Resiliency Program. *Journal of Consulting & Clinical Psychology*, 75, 9–19.
- Giwertz, A.H., Polusny, M.A., DeGarmo, D.S., Khaylis, A. & Erbes, C.R. (2010). Posttraumatic stress symptoms among National Guard soldiers deployed to Iraq: Associations with parenting behaviors and couple adjustment. *Journal of Consulting & Clinical Psychology*, 78, 599–610.
- Grieger, T.A., Cozza, S.J., Ursano, R.J., Hoge, C., Martinez, P.E., Engel, C.C. & Wain, H.J. (2006). Posttraumatic stress disorder and depression in battle-injured soldiers. *American Journal of Psychiatry*, 163, 1777–1783.
- Guastella, A.J., Richardson, R., Lovibond, P.F., Rapee, R.M., Gaston, J.E., Mitchell, P. & Dadds, M.R. (2008). A randomized controlled trial of D-cycloserine enhancement of exposure therapy for social anxiety disorder. *Biological Psychiatry*, 63, 544–549.

- Haskell, S.G., Gordon, K.S., Mattocks, K., Duggal, M., Erdos, J., Justice, A. & Brandt, C.A. (2010). Gender differences in rates of depression, PTSD, pain, obesity, and military sexual trauma among Connecticut war veterans of Iraq and Afghanistan. *Journal of Womens Health (Larchmont)*, 19, 267–271.
- Hoffmann, S.G., Meuret, A.E., Smits, J.A., Simon, N.M., Pollack, M.H., Eisenmenger, K., ...Otto, M.W. (2006). Augmentation of exposure therapy with D-cycloserine for social anxiety disorder. *Archives of General Psychiatry*, 63, 298–304.
- Hoge, C.W., Auchterlonie, J.L. & Milliken, C.S. (2006). Mental health problems, use of mental health services, and attrition from military service after returning from deployment to Iraq or Afghanistan. *Journal of the American Medical Association*, 295, 1023–1032.
- Hoge, C.W. & Castro, C.A. (2006). Post-traumatic stress disorder in UK and US forces deployed to Iraq. *Lancet*, 368, 837.
- Hoge, C.W., Castro, C.A., Messer, S.C., McGurk, D., Cotting, D.I. & Koffman, R.L. (2004). Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. *New England Journal of Medicine*, 351, 13–22.
- Hoge, C.W., Clark, J.C. & Castro, C.A. (2007a). Commentary: Women in combat and the risk of post-traumatic stress disorder and depression. *International Journal of Epidemiology*, 36, 327–329.
- Hoge, C.W., McGurk, D., Thomas, J.L., Cox, A.L., Engel, C.C. & Castro, C.A. (2008). Mild traumatic brain injury in US soldiers returning from Iraq. *New England Journal of Medicine*, 358, 453–463.
- Hoge, C.W., Terhakopian, A., Castro, C.A., Messer, S.C. & Engel, C.C. (2007b). Association of posttraumatic stress disorder with somatic symptoms, health care visits, and absenteeism among Iraq War veterans. *American Journal of Psychiatry*, 164, 150–153.
- Insel, T.R. (2010). Research activities at the National Institute of Mental Health affecting veterans and their families. Statement to the Committee on Appropriations, Subcommittee on Military Construction, Veterans Affairs, and Related Agencies, United States House of Representatives. Available at: <http://www.hhs.gov/asl/testify/2010/03/t20100323a.html> (accessed 2 December 2010).
- IoM (Institute of Medicine) (2010). *Returning home from Iraq and Afghanistan: Preliminary assessment of readjustment needs of veterans, service members, and their families*. (pp. 94–98). Washington, DC: National Academies Press.
- Jacobson, I.G., Ryan, M.A., Hooper, T.I., Smith, T.C., Amoroso, P.J., Boyko, E.J., ...Bell, N.S. (2008). Alcohol use and alcohol-related problems before and after military combat deployment. *Journal of the American Medical Association*, 300, 663–675.
- Jacobson, I.G., Smith, T.C., Smith, B., Keel, P.K., Amoroso, P.J., Wells, T.S., ...Ryan, M.A. (2009). Disordered eating and weight changes after deployment: Longitudinal assessment of a large US military cohort. *American Journal of Epidemiology*, 169, 415–427.
- Kang H. (2008). *Analysis of VA Health care Utilization among US Global War on Terrorism (GWOT) Veterans*. Washington, DC: Department of Veterans Affairs.
- Kang, H.K., Li, B., Mahan, C.M., Eisen, S.A. & Engel, C.C. (2009). Health of US veterans of 1991 Gulf War: A follow-up survey in 10 years. *Journal of Occupational & Environmental Medicine*, 51, 401–410.
- Kang, H.K., Natelson, B.H., Mahan, C.M., Lee, K.Y. & Murphy, F.M. (2003). Post-traumatic stress disorder and chronic fatigue syndrome-like illness among Gulf War veterans: A population-based survey of 30,000 veterans. *American Journal of Epidemiology*, 157, 141–148.
- Kessler, R.C. (2000). Posttraumatic stress disorder: The burden to the individual and to society. *Journal of Clinical Psychiatry*, 61S5, S4–12.
- Kim, P.Y., Thomas, J.L., Wilk, J.E., Castro, C.A. & Hoge, C.W. (2010). Stigma, barriers to care, and use of mental health services among active duty and National Guard soldiers after combat. *Psychiatric Services* (Washington, DC), 61, 582–588.
- Kimerling, R., Street, A.E., Pavao, J., Smith, M.W., Cronkite, R.C., Holmes, T.H. & Frayne, S.M. (2010). Military-related sexual trauma among Veterans Health Administration patients returning from Afghanistan and Iraq. *American Journal of Public Health*, 100, 1409–1412.
- Kline, A., Falca-Dodson, M., Sussner, B., Ciccone, D.S., Chandler, H., Callahan, L. & Losonczy, M. (2010). Effects of repeated deployment to Iraq and Afghanistan on the health of New Jersey Army National Guard troops: implications for military readiness. *American Journal of Public Health*, 100, 276–283.
- Kulka, R.A., Schlenger, W.E., Fairbank, J.A., Hough, R.L., Jordan, B.K., Marmar, C.R., ...Grady, D.A. (1990). *Trauma and the Vietnam War generation: Report of Findings from the National Vietnam Veterans Readjustment Study*. New York, NY: Brunner/Mazel.
- LeardMann, C.A., Smith, B. & Ryan, M.A. (2010). Do adverse childhood experiences increase the risk of postdeployment post-traumatic stress disorder in US Marines? *BMC Public Health*, 10, 437.
- LeardMann, C.A., Smith, T.C., Smith, B., Wells, T.S. & Ryan, M.A. (2009). Baseline self reported functional health and vulnerability to post-traumatic stress disorder after combat deployment: Prospective US military cohort study. *British Medical Journal*, 338, b1273.
- Leedham, C.S., Blood, C.G. & Newland, C. (1993) A descriptive analysis of wounds among US Marines treated at second-echelon facilities in the Kuwaiti theater of operations. *Military Medicine*, 158, 508–512.
- Lester, P.B., McBride, S.B., Bliese, P.D. & Adler, A.B. (2011). Bringing science to bear: An empirical assessment of the Comprehensive Soldier Fitness program. *The American Psychologist*, 66, 77–81.
- Litz, B.T., Engel, C.C., Bryant, R. & Papa, A. (2007). A randomized, controlled proof-of-concept trial of an internet-based, therapist-assisted self-management treatment for posttraumatic stress disorder. *American Journal of Psychiatry*, 164, 1–8.
- Magruder, K.M., Frueh, B.C., Knapp, R.G., Davis, L., Hamner, M.B., Martin, R.H., ...Arana, G.W. (2005). 17. Prevalence of post-traumatic stress disorder in Veterans Affairs primary care clinics. *General Hospital Psychiatry*, 27, 169–179.
- Maguen, S., Lucenko, B.A., Reger, M.A., Gahm, G.A., Litz, B.T., Seal, K.H., ...Marmar, C.R. (2010a). The impact of reported direct and indirect killing on mental health symptoms in Iraq war veterans. *Journal of Traumatic Stress*, 23, 86–90.
- Maguen, S., Ren, L., Bosch, J.O., Marmar, C.R. & Seal, K.H. (2010b). Gender differences in mental health diagnoses among Iraq and Afghanistan veterans enrolled in Veterans Affairs health care. *American Journal of Public Health*, 100, 2450–6.
- Maguen, S., Suvak, M. & Litz, B.T. (2006). Predictors and prevalence of posttraumatic stress disorder among military veterans. In A.B. Adler, C.A. Castro & T.W. Britt (Eds), *Military life: The psychology of serving in peace and combat*, Vol. 2: *Operational Stress* (pp. 141–169). Westport, CT: Praeger Security International.
- Mansfield, A.J., Kaufman, J.S., Gaynes, B.N. & Engel, C.C. (2010a). *Deployment and mental health diagnoses among us military children*. Abstract presented at the Annual Meeting of the Society for Epidemiologic Research, Seattle, WA, June.
- Mansfield, A.J., Kaufman, J.S., Marshall, S.W., Gaynes, B.N., Morrissey, J.P. & Engel, C.C. (2010b). Deployment and the use of mental health services among US Army wives. *New England Journal of Medicine*, 362, 101–109.
- McHugh, R.K. & Barlow, D.H. (2010). The dissemination and implementation of evidence-based psychological treatments. A review of current efforts. *American Psychologist*, 65, 73–84.
- MHAT-II (2005) Operation Iraqi Freedom (OIF-II) Mental Health Advisory Team (MHAT-II) Report. Available at: www.armymedicine.army.mil/reports/reports.html (accessed 22 November 2010).
- MHAT-V (2008). Mental Health Advisory Team (MHAT-V) Operation Iraqi Freedom 06–08: Iraq Operation Enduring

- Freedom 8: Afghanistan. Available at http://www.armymedicine.army.mil/reports/mhat/mhat_v/MHAT_V_OIFandOEF-Redacted.pdf (accessed 22 November 2010).
- Milad, M.R. & Quirk, G.J. (2002). Neurons in medial prefrontal cortex signal memory for fear extinction. *Nature*, 420, 70–74.
- Milliken, C.S., Auchterlonie, J.L. & Hoge, C.W. (2007). Longitudinal assessment of mental health problems among active and reserve component soldiers returning from the Iraq War. *Journal of the American Medical Association*, 298, 2141–2148.
- Munsey, C. (2009). Air Force revitalizes program that matches psychologists with physicians. *Monitor on Psychology*, 40(1), 13.
- MSMR (Medical Surveillance Monthly Report) (2010). Update: Deployment health assessments, US Armed Forces, April 2010. *Medical Surveillance Monthly Report*, 17, 18–20.
- Okie, S. (2005). Traumatic brain injury in the war zone. *New England Journal of Medicine*, 352, 2043–2047.
- Ouimette, P., Wade, P., Coolhart, D., Tirone, D., Goodwin, E. & Semene, S. (2010). Measuring PTSD course among substance use disorder patients: A pilot study of the interrater reliability and validity of the Longitudinal Interval Follow-Up Evaluation (LIFE). *Traumatology*, 16, 19–26.
- Phillips, C.J., LeardMann, C.A., Gumb, G.R. & Smith, B. (2010). Risk factors for posttraumatic stress disorder among deployed US male marines. *BMC Psychiatry*, 10, 52.
- Pietrzak, R.H., Johnson, D.C., Goldstein, M.B., Malley, J.C. & Southwick, S.M. (2009). Posttraumatic stress disorder mediates the relationship between mild traumatic brain injury and health and psychosocial functioning in veterans of Operations Enduring Freedom and Iraqi Freedom. *Journal of Nervous & Mental Disease*, 197, 748–753.
- Ressler, K.J., Rothbaum, B.O., Tannenbaum, L., Anderson, P., Graap, K., Zimand, E., ... Davis, M. (2004). Cognitive enhancers as adjuncts to psychotherapy: use of D-cycloserine in phobic individuals to facilitate extinction of fear. *Archives of General Psychiatry*, 61, 1136–1144.
- Rundell, J.R. (2006). Demographics of and diagnoses in Operation Enduring Freedom and Operation Iraqi Freedom personnel who were psychiatrically evacuated from the theater of operations. *General Hospital Psychiatry*, 28, 352–356.
- Schlenger, W.E., Kulka, R.A., Fairbank, J.A., Hough, R.L., Jordan, B.K., Marmar, C.R. & Weiss, D.S. (1992). The prevalence of post-traumatic stress disorder in the Vietnam generation: A multi-method, multisource assessment of psychiatric disorder. *Journal of Traumatic Stress*, 5, 333–363.
- Schwab, K.A., Ivins, B. & Salazar, A.M. (2003). Brain injury, epidemiological issues. In M.J. Aminoff & R.B. Daroff (Eds), *Encyclopedia of the Neurological Sciences*, pp. 438–445. Boston, MA: Academic Press.
- Seal, K.H., Metzler, T.J., Gima, K.S., Bertenthal, D., Maguen, S. & Marmar, C.R. (2009). Trends and risk factors for mental health diagnoses among Iraq and Afghanistan veterans using Department of Veterans Affairs health care, 2002–2008. *American Journal of Public Health*, 99, 1651–1658.
- Smith, T.C., Ryan, M.A., Wingard, D.L., Slymen, D.J., Sallis, J.F. & Kritz-Silverstein, D. (2008a). New onset and persistent symptoms of post-traumatic stress disorder self reported after deployment and combat exposures: Prospective population based US military cohort study. *British Medical Journal*, 336, 366–371.
- Smith, T.C., Wingard, D.L., Ryan, M.A., Kritz-Silverstein, D., Slymen, D.J. & Sallis, J.F. (2008b). Prior assault and posttraumatic stress disorder after combat deployment. *Epidemiology*, 19, 505–512.
- Stiglitz, J.E. & Bilmes, L.J. (2008). *The three trillion dollar war: The true cost of the Iraq conflict*. New York: Norton.
- Terrio, H., Brenner, L.A., Ivins, B.J., Cho, J.M., Helmick, K., Schwab, K., ... Warden, D. (2009). Traumatic brain injury screening: Preliminary findings in a US Army brigade combat team. *Journal of Head Trauma Rehabilitation*, 24, 14–23.
- Thomas, J.L., Castro, C.A., Adler, A.B., Bliese, P.D., McGurk, D., Cox, A. & Hoge, C.W. (2007). The Efficacy of Battlemind at Immediate Post Deployment Reintegration. Paper presented at the Battlemind Training System: Supporting soldiers throughout the deployment cycle symposium at the 2007 American Psychological Association Annual Convention. San Francisco, CA, August.
- Thomas, J.L., Wilk, J.E., Riviere, L.A., McGurk, D., Castro, C.A. & Hoge, C.W. (2010). Prevalence of mental health problems and functional impairment among active component and National Guard soldiers 3 and 12 months following combat in Iraq. *Archives of General Psychiatry*, 67, 614–623.
- Unützer, J., Choi, Y., Cook, I.A. & Oishi, S. (2002). A web-based data management system for improve care for depression in a multicenter clinical trial. *Psychiatric Services*, 53, 671–678.
- US Army (2008). Report to the Surgeon General Traumatic Brain Injury Task Force. Available at: <http://www.army.mil/reports/tbi/TBITaskForceReportJanuary2008.pdf> (accessed 13 January 2011).
- Wang, P.S., Berglund, P., Olfson, M., Pincus, H.A., Wells, K.B. & Kessler, R.C. (2005). Failure and delay in initial treatment contact after first onset of mental disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, 62, 603–613.
- Warner, C.H., Appenzeller, G.N., Breitbach, J.E., Mobbs, A. & Lange, J.T. (2011). The CARE framework: The broadening of mental health services in a deployed environment. In A.B. Adler, P.B. Bliese & C.A. Castro (Eds), *Deployment Psychology: Evidence-based Strategies to Promote Mental Health in the Military* (pp. 35–68). Washington, DC: American Psychological Association.
- Weathers, R., Keane, T.M. & Foa, E.B. (2009). Assessment and diagnosis of adults. In E.B. Foa, T.M. Keane, M.J. Friedman & J.A. Cohen (Eds), *Effective Treatments for PTSD: Practice Guidelines from the International Society of Traumatic Stress Studies* (2nd ed., pp. 23–61). New York, NY: Guilford Press.
- Wells, T.S., LeardMann, C.A., Fortuna, S.O., Smith, B., Smith, T.C., Ryan, M.A., ... Blazer, D. (2010). A prospective study of depression following combat deployment in support of the wars in Iraq and Afghanistan. *American Journal of Public Health*, 100, 90–99.
- Wojcik, B.E., Akhtar, F.Z. & Hassell, L.H. (2009). Hospital admissions related to mental disorders in US Army soldiers in Iraq and Afghanistan. *Military Medicine*, 174, 1010–1018.
- Zeiss, A. & Karlin, B. (2008). Integration of mental health and primary care services in the Department of Veterans Affairs health care system. *Journal of Clinical Psychology in Medical Settings*, 15, 73–78.

REPORT DOCUMENTATION PAGE

The public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB Control number. **PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.**

1. REPORT DATE (DD MM YY) 06 12 10		2. REPORT TYPE Journal submission		3. DATES COVERED (from – to) Jul–Dec 2010	
4. TITLE Mental Health Impact of the Iraq and Afghanistan Conflicts: A Review of US Research, Service Provision, and Programmatic Responses				5a. Contract Number: 5b. Grant Number: 5c. Program Element Number: 5d. Project Number: 5e. Task Number: 5f. Work Unit Number: 60002	
6. AUTHORS Wells, Timothy S.; Miller, Shannon C.; Adler, Amy B.; Engel, Charles C.; Smith, Tyler C.; Fairbank, John A.					
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Commanding Officer Naval Health Research Center 140 Sylvester Rd San Diego, CA 92106-3521					
8. SPONSORING/MONITORING AGENCY NAMES(S) AND ADDRESS(ES) Commanding Officer Naval Medical Research Center 503 Robert Grant Ave Silver Spring, MD 20910-7500				8. PERFORMING ORGANIZATION REPORT NUMBER 11-10	
				10. SPONSOR/MONITOR'S ACRONYM(S) NMRC/NMSC	
				11. SPONSOR/MONITOR'S REPORT NUMBER(s)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT <p>Although documentation that war inflicts psychological casualties dates back to the American Civil War, most research began after the Vietnam conflict, when studies focused primarily on posttraumatic stress disorder (PTSD). With ongoing conflicts in Iraq and Afghanistan, there has been significant research to illuminate the epidemiology of war-related psychological casualties. Significant findings include an appreciation for the role combat plays in the development of mental disorders, including PTSD, depression, alcohol misuse, somatic symptoms, and others. Recent research has endeavored to understand and improve psychological resilience to temper the negative effects of combat on mental health. With over 2 million US service members involved in the Iraq/Afghanistan conflicts, military mental health practitioners have observed a dramatic increase in the number of US service members who have obtained care. Additionally, the Department of Defense has aggressively worked to improve mental health care. The Department of Veterans Affairs has seen increases in veterans seeking care for mental disorders, and it is adapting staffing levels to meet current and future needs. Scientists will continue efforts to better understand the determinants and prevention of combat-related mental disorders, and they will work with clinicians who strive to improve services and treatment modalities for veterans.</p>					
15. SUBJECT TERMS military personnel, combat disorders					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT UNCL	18. NUMBER OF PAGES 9	18a. NAME OF RESPONSIBLE PERSON Commanding Officer
a. REPORT UNCL	b. ABSTRACT UNCL	c. THIS PAGE UNCL			18b. TELEPHONE NUMBER (INCLUDING AREA CODE) COMM/DSN: (619) 553-8429